Amendments to the Claims:

Claims 1, 6, 12, 15, 17, 20-32, 38, and 43 have been amended herein and claim 5 has been canceled. Please note that all claims currently pending and under consideration in the referenced application are shown below. Please enter these claims as amended. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended) A method for tracking a particle through a geometric model, the method comprising:

arranging a plurality of substantially uniform volume elements into the geometric model;

describing a movement of the particle through the geometric model with a particle track; ~~and~~

traversing the particle along the particle track from one uniform volume element to another uniform volume element in integer based increments;

determining a material of both the one uniform volume element and the another uniform volume element; and

terminating the traversing the particle when the material of the another uniform volume element is substantially different from the material of the one uniform volume element.

2. (Previously presented) A method according to claim 1, further comprising converting a plurality of pixels of information contained in a medical image into the uniform volume elements.

3. (Previously presented) A method according to claim 1, further comprising defining a material to be associated with each of the uniform volume elements.

4. (Previously presented) A method according to claim 3, further comprising mapping each material associated with each of the uniform volume elements to an array.

5. (canceled)

6. (currently amended) A method according to claim ~~5~~1, further comprising determining a position of intersection along the particle track where the material of the one uniform volume element changed into the material of the another uniform volume element.

7. (Previously presented) A method according to claim 6, further comprising reporting the position of intersection.

8. (Previously presented) A method according to claim 1, wherein the particle track has a primary direction of movement, further comprising traversing the particle along the particle track along the primary direction of movement.

9. (Previously presented) A method according to claim 1, further comprising setting an initial condition for the particle track.

10. (Previously presented) A method according to claim 9, wherein the particle traverses along the particle track beginning in a starting element of the uniform volume elements and traverses to a next element of the uniform volume elements, further comprising determining a center value of the starting element along a primary direction of movement for the particle track, the center value representing at least a portion of an adjusted coordinate from which the particle will begin traversal along the particle track.

11. (Previously presented) A method according to claim 10, wherein the particle track has at least one secondary direction of movement, further comprising determining a beginning coordinate value for each secondary direction of movement in response to the determining the center value of the starting element along the primary direction of movement.

12. (currently amended) ~~A method for tracking a particle through a geometric model, the method comprising:~~

~~arranging a plurality of substantially uniform volume elements into the geometric model;~~

~~describing a movement of the particle through the geometric model with a particle track; and~~

~~traversing the particle along the particle track from one uniform volume element to another uniform volume element in integer based increments;~~

~~A method according to claim 1,~~ wherein the particle track has at least one secondary direction of movement, and further comprising calculating an error term for each secondary direction of movement, the error term being used to adjust a coordinate value whenever the error term exceeds a threshold value.

13. (Previously presented) A method for simulating particle transport through a geometric model, the method comprising:

arranging a plurality of substantially uniform volume elements into the geometric model;

defining a material to be associated with each of the uniform volume elements, at least one of the uniform volume elements corresponding to a radiation source;

describing a particle track with a primary direction of movement through the geometric model, the particle track beginning substantially internally within the geometric model at the one of the uniform volume elements corresponding to the radiation source in a starting element of the uniform volume elements and traversing to a next element of the uniform volume elements; and

following a particle along the particle track through the geometric model until the material of the next element is substantially different from the material of the starting element.

14. (Previously presented) A method according to claim 13, wherein the describing the particle track comprises defining an initial position and a vector for the particle.

15. (currently amended) A method according to claim 13, wherein the defining the material to be associated with each ~~the~~ uniform volume element further comprises mapping each the material to an array.

16. (Previously presented) A method according to claim 13, wherein the following the particle along the particle track comprises stepping along the particle track in integer based increments of the coordinate system along the primary direction of movement.

17. (currently amended) A method of computationally enlarging a radiation distribution for a treatment volume irradiated during radiation therapy having a radiation source substantially internal within a patient, the method comprising:

obtaining a medical image of the treatment volume, the medical image containing a plurality of pixels of information;

converting the pixels into a plurality of substantially uniform volume elements;

arranging the uniform volume elements into a geometric model;

defining a material to be associated with each ~~the~~ uniform volume element, at least one of the uniform volume elements corresponding to the radiation source;

describing a plurality of particle tracks through the geometric model, the particle tracks beginning substantially internally within the geometric model at the one of the uniform volume elements corresponding to the radiation source having a primary direction of movement beginning in a starting element of the uniform volume elements and traversing to a next element of the uniform volume elements;

simulating a particle movement along each particle track of the plurality of particle tracks through the geometric model in integer based increments along the primary direction of movement until a position when the material of the next element is substantially different from the material of the starting element, the particle corresponding to an alpha, beta or gamma emission emanating from the radiation source during the radiation therapy, the position corresponding to at least one of the particles being captured, scattered and exited from the geometric model; and

computing a distribution of radiation doses based upon the particle movement along each of the particle tracks.

18. (Previously presented) A method according to claim 17, further comprising generating a plurality of axial slices of the treatment volume.

19. (Previously presented) A method according to claim 17, wherein the converting the pixels into the uniform volume elements further comprises proportionally converting a volume and shape of the pixels into a corresponding volume and shape of the uniform volume elements.

20. (currently amended) A computer readable medium having computer executable instructions, which when executed on a computer perform a process for tracking a movement of a particle through a geometric model, the ~~process~~ computer executable instructions comprising instructions for:

arranging a plurality of substantially uniform volume elements into the geometric model;

mapping a material associated with each the uniform volume element to an array, at least one of the uniform volume elements being mapped to a radiation source;

projecting the movement of the particle through the geometric model with a particle track beginning in a starting element of the uniform volume elements and traversing to a next element of the uniform volume elements; and

traversing the particle along the particle track in integer based increments until the material of the next element is substantially different from the material of the starting element.

21. (currently amended) A computer readable medium according to claim 20, further comprising computer executable instructions for storing the array in a storage device.

22. (currently amended) A computer readable medium according to claim 20, further comprising computer executable instructions for establishing a center value for the particle track along a primary direction of movement thereof.

23. (currently amended) A computer readable medium according to claim 20, further comprising computer executable instructions for storing the array by integers determined from a selected coordinate system.

24. (currently amended) A computer readable medium according to claim 23, further comprising computer executable instructions for computing error terms to be associated with at least one secondary direction of movement, the error terms being used to properly identify the materials stored in the array.

25. (currently amended) A computer readable medium according to claim 20, further comprising computer executable instructions for:

reading a medical image of a treatment volume irradiated by the radiation source having a plurality of pixels of information contained therein; and

converting the pixels into the uniform volume elements.

26. (currently amended) A computer readable medium according to claim 25, further comprising computer executable instructions for proportionally converting a volume and shape of the pixels into a corresponding volume and shape of the uniform volume elements.

27. (currently amended) A computer readable medium according to claim 25, wherein the medical image comprises a plurality of substantially cross-sectional slices of the treatment volume, further comprising computer executable instructions for stacking the uniform volume elements into a three dimensional representation of the treatment volume.

28. (currently amended) A computer readable medium according to claim 20, further comprising computer executable instructions for displaying the geometric model.

29. (currently amended) A computer readable medium having computer executable instructions, which when executed on a computer perform a process for computationally enlarging a radiation distribution of a treatment volume irradiated during a radiation therapy having a radiation source, the computer executable instructions ~~process~~ comprising instructions for:

reading a medical image of the treatment volume, the medical image containing a plurality of pixels of information;

converting the pixels into a plurality of substantially uniform volume elements;

mathematically arranging the uniform volume elements into a geometric model substantially representing the treatment volume;

mapping a material associated with each of the uniform volume elements to an array, at least one of the uniform volume elements corresponding to the radiation source;

describing a plurality of particle tracks through the geometric model, the particle tracks beginning substantially internally within the geometric model in a starting element of the uniform volume elements and traversing to a next element of the uniform volume elements;

simulating a particle movement along each particle track of the plurality of particle tracks through the geometric model in integer based increments until a position when the material of the next element is substantially different from the material of the starting element, the particle corresponding to an alpha, beta or gamma emission emanating from the radiation source during the radiation therapy, the position corresponding to at least one of the particle being captured, scattered and exited from the geometric model; and

computing a distribution of radiation doses based upon the particle movement along each of the particle tracks.

30. (currently amended) A computer readable medium having computer executable modules including computer executable instruction, which when executed on a computer perform a process for enlarging a radiation distribution of a treatment volume irradiated during a radiation therapy having a radiation source, the modules comprising:

a reader module for converting a plurality of pixels of information contained in a medical image into a corresponding plurality of uniform volume elements;

a modeling module for arranging the uniform volume elements into a geometric representation of the treatment volume;

a storage module for storing a material for each of the uniform volume elements, at least one of the uniform volume elements being stored as corresponding to the radiation source;

a projection module for tracking a movement of a particle through the geometric representation according to integer based steps until a position when the material of a uniform volume element of the plurality is substantially different from the material of a starting element of the plurality of uniform volume elements; and

a random generation module for calculating a status of the particle as the movement of the particle is tracked through the geometric representation.

31. (currently amended) A method for enlarging a radiation distribution of a treatment volume irradiated during a radiation therapy having a radiation source, the method comprising:

creating a geometric model of the treatment volume;

describing a movement having a primary direction ~~and at least one secondary direction thereof~~ of a particle through the geometric model in integer based increments along the primary direction, the particle representing an alpha, beta or gamma emission emanating from the radiation source during the radiation therapy; ~~and~~

~~calculating an error term for each secondary direction, the error term being used to adjust a coordinate value whenever the error term exceeds a threshold value; and~~

computing a distribution of radiation doses based upon the movement of the particle.

32. (currently amended) A method according to claim 31, wherein the geometric model is comprised of a plurality of substantially uniform volume elements, further comprising defining a material to be associated with each ~~the~~ uniform volume element, at least one of the uniform volume elements corresponding to the radiation source.

33. (Previously presented) A method according to claim 32, wherein the movement begins substantially internally within the geometric model in a starting element of the uniform volume elements and traverses to a next element of the uniform volume elements, further comprising describing the movement of the particle through the geometric model until the material of the next element is substantially different from the material of the starting element.

34. (Previously presented) A method according to claim 33, further comprising determining a position where along the movement, the material of the next element is substantially different from the material of the starting element.

35. (Previously presented) A computer readable medium having computer executable instructions, which when executed on a computer perform a process comprising the acts as

recited in claim 31.

36. (Previously presented) A method for simulating particle transport through a geometric model, the method comprising:

arranging a plurality of substantially uniform volume elements into the geometric model;

defining a material to be associated with each of the uniform volume elements, at least one of the uniform volume elements corresponding to a radiation source;

describing a particle track with a primary direction of movement through the geometric model, the particle track beginning within a surface uniform volume element first encountered by a particle from an externally-applied radiation source and proceeding therefrom as if the particle track were born within the first surface uniform volume element; and

following a particle along the particle track through the geometric model until the material of the next element is substantially different from the material of the starting element.

37. (Previously presented) A method according to claim 36, wherein the describing the particle track comprises defining an initial position and a vector for the particle.

38. (currently amended) A method according to claim 36, wherein the defining the material to be associated with each ~~the~~ uniform volume element further comprises mapping each ~~the~~ material to an array.

39. (Previously presented) A method according to claim 36, wherein the following the particle along the particle track comprises stepping along the particle track in integer based increments of the coordinate system along the primary direction of movement.

40. (Previously presented) A method of computationally enlarging a radiation distribution for a treatment volume irradiated during radiation therapy having a radiation source external to a patient, the method comprising:

obtaining a medical image of the treatment volume, the medical image containing a plurality of pixels of information;

converting the pixels into a plurality of substantially uniform volume elements;

arranging the uniform volume elements into a geometric model;
defining a material to be associated with each of the uniform volume elements, at least one of the uniform volume elements corresponding to the radiation source;
describing a plurality of particle tracks through the geometric model, the plurality of particle tracks beginning within a surface uniform volume element first encountered by particles from an externally-applied radiation source and proceeding therefrom as if the plurality of particle tracks were born within the first surface uniform volume element; and
simulating a particle movement along each particle track of the plurality of particle tracks through the geometric model in integer based increments along the primary direction of movement until a position when the material of the next element is substantially different from the material of the starting element, the particle corresponding to an alpha, beta or gamma emission emanating from the radiation source during the radiation therapy, the position corresponding to at least one of the particle being captured, scattered and exited from the geometric model; and
computing a distribution of radiation doses based upon the particle movement along each of the particle tracks.

41. (Previously presented) A method according to claim 40, further comprising generating a plurality of axial slices of the treatment volume.

42. (Previously presented) A method according to claim 40, wherein the converting the pixels into the uniform volume elements further comprises proportionally converting a volume and shape of the pixels into a corresponding volume and shape of the uniform volume elements.

43. (currently amended) A computer readable medium having computer executable instructions, which when executed on a computer perform a process for computationally enlarging a radiation distribution of a treatment volume irradiated during a radiation therapy having a radiation source, the computer executable instructions ~~process~~ comprising instructions for:
reading a medical image of the treatment volume, the medical image containing a plurality of pixels of information;

converting the pixels into a plurality of substantially uniform volume elements;

mathematically arranging the uniform volume elements into a geometric model substantially representing the treatment volume;

mapping a material associated with each ~~the~~ uniform volume element to an array, at least one of the uniform volume elements corresponding to the radiation source;

describing a plurality of particle tracks through the geometric model, the plurality of particle tracks beginning within a surface uniform volume element first encountered by particles from an externally-applied radiation source and proceeding therefrom as if the plurality of particle tracks were born within the first surface uniform volume element; and

simulating a particle movement along each particle track of the plurality of particle tracks through the geometric model in integer based increments until a position when the material of the next element is substantially different from the material of the starting element, the particle corresponding to an alpha, beta or gamma emission emanating from the radiation source during the radiation therapy, the position corresponding to at least one of the particle being captured, scattered and exited from the geometric model; and

computing a distribution of radiation doses based upon the particle movement along each of the particle tracks.